Plasma–Carbon Interaction Cross-Section (sigma_pc)

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Abstract

This document presents a phenomenological framework describing the interaction and detectability between coherent atmospheric plasma structures and carbon-based physical measurement systems (sensors and instrumentation composed of condensed matter). The model introduces a bounded, dimensionless interaction cross-section intended for correlation and detection analysis under variable environmental conditions.

1. Conceptual Scope

The framework treats atmospheric plasma structures as coherent, non-solid configurations sustained by electromagnetic gradients. No biological or intelligent properties are assumed. The formulation is explicitly non-mechanistic and does not introduce new forces or violations of thermodynamic constraints.

2. Phenomenological Derivation

Detectability depends on the ratio between internal plasma oscillatory energy and ambient thermal noise, modulated by environmental entropy and system coherence.

Interaction Cross-Section

sigma_pc = alpha * (hbar * omega_gamma / (k_B * T)) * (C_coh / D_static)

where alpha is the electromagnetic coupling constant, hbar * omega_gamma is the characteristic oscillatory energy of the plasma, k_B * T represents ambient thermal energy, C_coh represents system or observer coherence, and D_static represents environmental entropic density.

3. Test Procedures

3.1 Near-Infrared Optical Analysis: High-speed narrow-band imaging is used to detect non-ballistic luminous motion inconsistent with aerodynamic drag models.

3.2 RF Spectral Shadowing: Wideband spectrum monitoring is employed to identify localized, transient reductions in ambient RF noise correlated with optical anomalies.

3.3 Resonant Modulation Test: Mechanical or electromagnetic stimulation is applied to detected regions to assess synchronized changes in optical or RF signatures.

4. Constraint Compliance

All tests are correlation-based, require cross-modal confirmation, and comply with determinism, thermodynamics, and instrumental falsifiability. No causal claims are asserted.